The AIDS Epidemic and Its Economic Roots

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Do Education Campaigns in Africa Really Matter?

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Economists have a vital role to play in helping public health officials and policymakers understand the AIDS epidemic and design efficient policies to limit its impact. AIDS is first and foremost a public health problem, but it is a problem with deep economic roots. In Africa, an estimated 24.5 million people were living with HIV at the end of 2005, approximately 60% of all HIV cases in the world.[1] Many explanations for the steady incidence rate of HIV have been proposed, such as gender[2], presence of other STDs[3], drug injections[4] and circumcision.[5] Public health experts have long promised that effective education campaigns are lacking in much of the developing world, but once these materialize, officials predict that they will bring down the incidence rates and the prevalence of HIV in Africa.[6,7]

Uganda's first AIDS control program was set up in 1987 to educate the public about how to avoid becoming infected with HIV. The program promoted the ABC approach (abstain, be faithful, use condoms), ensured the safety of the blood supply and started HIV surveillance.[8] The ABC education campaign is widely associated with bringing adult HIV prevalence down from around 15% in the early 1990s to around 5% in 2001.[9,10] The country is considered by many public health officials as having implemented a well-timed and successful public campaign.[11]

Likewise, a variety of other countries have enacted policies to counter the rise in the HIV prevalence, such as a greater emphasis on safe sexual behaviors. However, much of this discussion has occurred ad hoc. Extorting individuals in most African countries to engage in safe sexual behaviors seems to have little effect on incidence rates. In theory, it seems reasonable that people would adopt safer sexual practices, including monogamy, in response to HIV risks. Why is it that this prediction fails to hold true in practice?

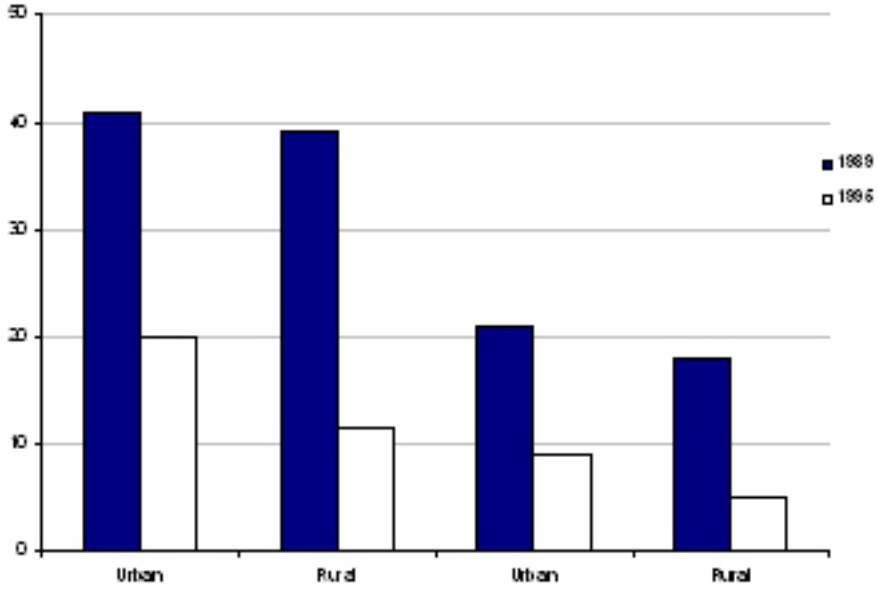

Figure 1. Reported Casual Sex for Uganda in Past 12 Months 1989-1995

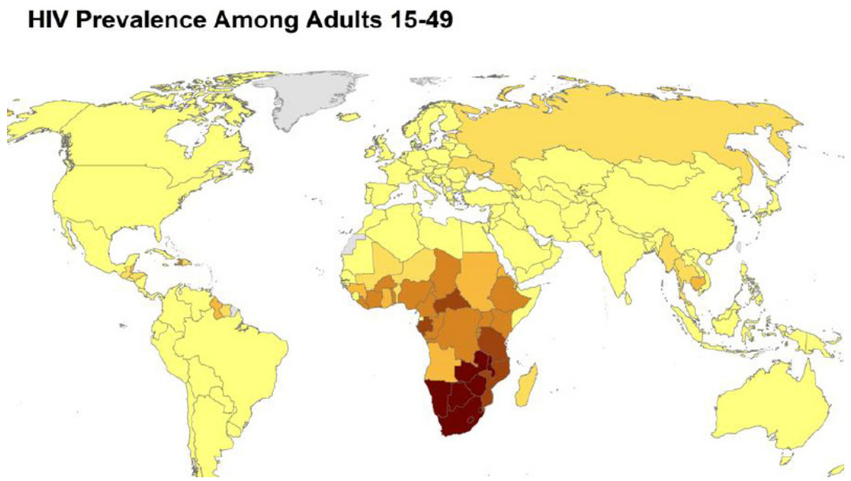

Figure 2. HIV prevalence in Africa (See figure 3 for exact numbers)

The Economic Framework and Behavior Change in Africa

Recent AIDS studies point to limited changes in sexual behavior in Africa.[12,13] Since around 1985 a number of studies were undertaken, in the United States, Australia and other developed countries, to determine the reasons why gay men adapted to the demands of behavior change in response to HIV and AIDS more readily than non-gay men.[14] It is clear that as early as the mid-1980s, before the initiation of large-scale public education campaigns, gay men enrolled in cohort studies modified their sexual behavior in response to growing awareness of the existence of AIDS and education campaigns mounted by gay community-based groups. Behavior change in response to education campaigns has been documented in high-risk individuals in the United States.[15] If contrasted with the extensive behavioral response of gay men in the United States since the mid-1980s to education campaigns, the lack of behavioral response to public health campaigns in Africa is stunning.

Economics provides a powerful way of examining the pattern of the epidemic's spread. The central idea is that HIV is not spread randomly, as tends to be the case with the bacteria that cause tuberculosis or the virus that causes the common cold. Rather, HIV is most often transmitted as a consequence of purposeful behavior that often has a strong economic foundation.[16,17]

Consider two men, one who expects to live for another ten years, and a second who expects to live for another fifty years. In a world without HIV, the choice of sexual behavior would not depend on the expected future life expectancy. However, in a world with HIV, sexual behavior carries a risk of death from HIV, assumed to happen ten years after infection.

Imagine that you are one of these two men. Will you choose to engage in unsafe sexual behavior if you are aware that by abstaining you significantly increase your lifespan? You would probably choose to abstain. But what if abstinence or engaging in safe sex had no effect on your life span? In this case, you would probably continue with your unsafe practices.

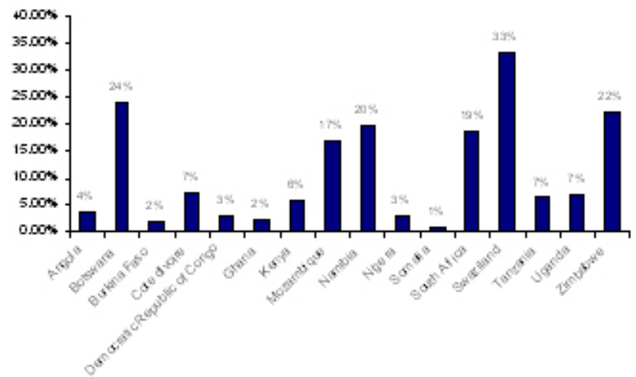

Figure 3. Adult Prevalence (in Percentages)

Region, subregion	1960-1969	1970-79	1980-89	1990-99	2000-04
Sub-Saharan Africa	42.4	46.3	49.0	47.6	45.9
Eastern Africa	43.4	47.3	49.4	46.7	45.7
Middle Africa	41.0	45.3	47.0	44.3	43.4
Southern Africa	50.7	54.4	59.6	59.6	47.7
Western Africa	40.3	43.9	47.1	47.2	46.3

Figure 4. Life Expectancy at Birth for Sub-Saharan Africa and UN Subregions, 1960-2005

Determinants of Behavior

Empirical results suggest a strong causal link between income, life expectancy, and behavior change. All three factors explain differences in the behavioral response between HIV risk groups in Africa and in the United States. Individuals with higher income and longer expected life span are more likely to respond to HIV risk by lowering their number of sexual partners.

One explanation of the limited behavior change in Africa relative to the US experience lies in the fact that US gay men featured in the study were wealthier and had longer life expectancy than individuals studied in Africa. Individuals who expect to be wealthier in the future have more incentive to invest in their future health and hence derive more happiness from the increase in wealth. This wealth, in turn, allows them to enjoy other activities and goods whose benefits outweigh those of unsafe sex.

It turns out that an increase in life expectancy for an individual is a stronger predictor of fertility and sexual behavior patterns than individual income. Empirical studies have found a positive causal link between an increase in average life expectancy at birth and investments in schooling and health.[18]

Price of a Sexual Partner as a Determinant

The cost of HIV infection and premature death depends on an individuals' life expectancy without HIV and their future wealth. One can think of the price of a sexual partner as simply the expected future utility losses from HIV infection conditional on the risk of infection that a person faces with a given sexual partner. If an individual knows that he or she will die for certain in ten years even without HIV (HIV infection usually results in death approximately ten years from the time of infection), the incentive to avoid risky behavior that will expose him or her to HIV is minimal. In other words, individuals with higher future value of life should have a greater response to the HIV risk.

A recent empirical study strongly supports this assertion. Oster (2007) analyzes the effect of HIV risk on behavioral response, including the interaction between malaria prevalence and the HIV rate.[19] In African areas with high rates of malaria, people already face a high risk of death and may have little incentive to change their sexual behavior.

To determine the magnitude of behavioral differences across groups, the study uses data on gay men between 1984 and 1999 and estimates future utility losses from HIV infection for individuals. Given data on individual income, future survival length, and HIV transmission rates, it estimates the "price" per sexual partner for a given individual: the expected dollar value of the future income lost from HIV infection. The study finds that a $10,000 increase in the "price" of a sexual partner in Africa decreased the probability of having multiple sexual partners by 3.2 percentage points. Among men in the United States, this decrease was around 3.5 percentage points. These results suggest a similar level of responsiveness for these two groups. However, the major difference between the groups is that the price per partner is much higher in the United States than in Africa. This suggests that if Africans were as rich and had life expectancies as long as people in the United States, they might experience similar behavior change.

As the data suggests, individuals who live in areas with high malaria prevalence and lower life expectancies have lower response to HIV education campaigns.

The Contribution of Economic Reasoning to Policymaking

The above analysis can provide a powerful lesson for evaluating the effectiveness of various policy interventions. Though most governments recognize that intervention in the area of HIV and AIDS in developing countries is necessary, the complexity of the mechanisms that lead to HIV infection and that determine the social and economic impact make effective policymaking an especially challenging task. Sound economic reasoning encourages policymaking directed at underlying problems, not at superficial symptoms. In this case, econom-

ics offers a set of tools that allow for rational policymaking and that can ultimately curb the epidemic in the African continent.

While existing work on HIV in Africa focuses on cultural barriers to changing behavior, economic reasoning from the point of view of the infected individuals suggests that standard economic theory may provide significant insights:

- **Individuals may rationally decide to accept unsafe sex in exchange for the short-term benefit associated with it.**

- **While public health advocates may encourage people to exercise safe sex, people will only perform it when it is the best use of their scarce time.**

In many sub-Saharan African countries, the incentive to change sexual behavior in response to HIV risks is very low. Policymakers must recognize that the issue is not entirely due to cultural differences. There is an important link between response to HIV and other mortality risks.

The two major differences lie in transmission rates of the virus and in the limited incentive for behavior change due to other mortality risks manifesting themselves in low life expectancy. First, for a given unprotected sexual relationship with an HIV-infected person, Africans are between four and five times more likely than Americans to become infected with HIV themselves. This stark fact accounts for virtually all of the difference in population-wide HIV rates in the two regions. There is more than one reason why HIV spreads more easily in Africa than America, but the most important one seems to be related to the prevalence of other sexually transmitted infections. Estimates suggest that around 11 percent of individuals in Africa have untreated bacterial sexually transmitted infections at any given time and close to half have the herpes virus. Because many of these infections cause open sores on the genitals, transmission of the HIV virus is much more efficient. The fact that Africa is so heavily affected by HIV has very little to do with differences in sexual behavior and very much to do with differences in circumstances. Perhaps even more importantly, there is potential for significant reductions in HIV transmission in Africa through the treatment of other sexually transmitted diseases. Such an approach would cost around $3.50 per year per life saved. Treating AIDS itself costs around $300 per year. There are reasons to provide AIDS treatment in Africa, but cost-effectiveness is not one of them.

The second difference lies in the insurmountable difference in life expectancies due to mortality associated with other non-HIV infectious diseases widely prevalent in the African continent. Life expectancy in much of the continent is already low not only due to HIV but also because of high prevalence of respiratory infections, TB, malaria, and other infectious diseases. What does this imply for behavior change? If your life expectancy is only 40-50 years due to environmental and disease factors, you might be more willing to take a 3% risk associated with having unprotected sex with one more sexual partner than a gay man in America who otherwise expects to live almost 80 years. Stated simply, if life expectancy in Africa were the same as it is in the United States, we would see the same change in sexual behavior—and the AIDS epidemic would begin to slow down. But this hypothetical is not supported by the difference in the life expectancies without HIV in the two continents.

Non-HIV mortality risks are the areas that health policymakers, economists, international organizations, nongovernmental organizations, and others concerned with the social and economic implications of the epidemic need to address most urgently. They involve complex issues that include matters of health, sociology, psychology, law, politics, and economics.

As governments and NGOs consider interventions like drug treatment, which change the cost of infection, the possibility of behavior change as a function of life expectancy and future income should be considered. Targeting populations with higher income and higher life expectancy within these countries are the strategies most likely to elicit the desired behavioral response that governments and development organizations would like to see.

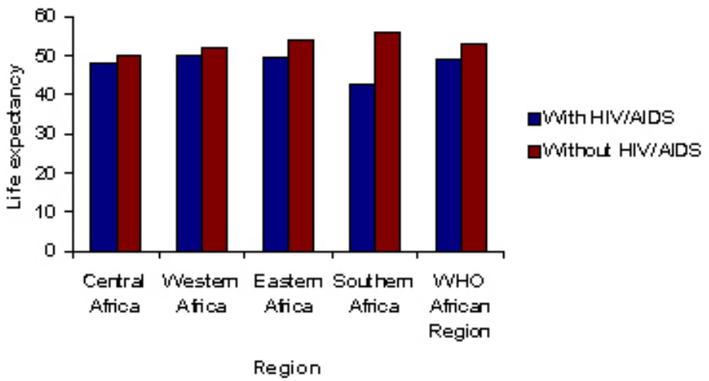

Figure 5. Life Expectancies with and without HIV

Furthermore, because mortality threats and poverty remain fundamental barriers to HIV prevention in Africa, interventions designed to decrease mortality risks, such as malaria, could even promote HIV prevention more than interventions targeting HIV prevention directly.

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